

Science and Spiritual Values

Commencement Address Comes from One of World's Leading Scientists

By Robert Andrews Millikan

MEMBERS of the Class of 1929 in the University of Michigan: You are today going out into the world that has been made by modern science. You are going to interpret the results of a scientific education to that world. I, a man of science, have been asked to say to you the last word that will be said as a part of your undergraduate education. I wish to make it as important a word as I can utter. That is why I have chosen the theme, "Science and Spiritual Values."

There are three groups of ideas that seem to me to stand out above all others in the influence they have exerted and are destined to exert upon the development of the human race. The first of these, and the most important of them all, is the gift of religion to the race. The other two sprang primarily from the womb of science.

They are: 1. The idea of the golden rule. 2. The idea of natural law. 3. The idea of age-long growth of evolution.

There will be common consent that the greatest, most consistent, most influential proponent of the idea of the golden rule who has ever lived was Jesus of Nazareth.

When the life and teachings of Jesus became the basis of the religion of the whole western world, an event of stupendous importance for the destinies of mankind had certainly taken place, for a new set of ideas had been definitely and officially adopted by a considerable fraction and an important fraction of the race.

The significance of this event is completely independent of the historicity of Jesus. The service of the Christian religion, my own faith and essential Christianity, would not be diminished one iota if it should in some way be discovered that no such individual ever existed. If the idea and ideals for which he stood sprang up spontaneously in the minds of men without the stimulus of a single great character, the result would be even more wonderful and more inspiring than it is now, for it would mean that the spirit of Jesus is actually more widely spread throughout the world than we realize. In making this statement I am endeavoring to say just as positively and emphatically as I can that the credentials of Jesus are found wholly in his teachings and his character as recorded by his teachings, and not at all in any real or historical events. And in mak-

ing this affirmation let me also emphasize the fact that I am only paraphrasing Jesus' own words when he refused to let his disciples rest his credentials upon a sign.

My conception then of the essentials of religion, at least of the Christian religion, is that those essentials consist in just two things—first, in inspiring mankind with the Christlike (i. e., the altruistic) ideal, and that means specifically concern for the common good as contrasted with one's own individual impulses and interests, wherever, in one's own judgment, the two come into conflict; and second, in inspiring mankind to do its duty, the definition of duty for every individual being what he himself believes to be for the common good.

In few words, I conceive the essential task of religion to be to develop the consciences, the ideals, and the aspirations of mankind. If then the essence of the gospel of Jesus is to be found in the golden rule, which, broadly interpreted, means the development in the individual of a sense of social responsibility, then it is obvious that the essentials of Christianity will always be needed in a world of science. For civilization itself is dependent in the last analysis upon just this thing.

The change from the individual life of the animal to the group life of civilized man in a world of science, a life of ever-expanding complexity and interrelatedness, as civilization advances, is obviously impossible unless, in general, the individual learns, in ever-increasing measure, to subordinate his impulses and interests to the furtherance of the group life. In other words, as our highly organized scientific and industrial civilization advances the future is going to need the essentials of Christianity even more than the past has needed them.

This means that the job which the churches have in the main been trying to do, and the job which, in spite of their weaknesses and follies, they have, as I think, succeeded fairly well in doing—namely, the job of developing the consciences, the ideals and the aspirations of mankind—must be done by some agency in the future even more effectively than it has been done in the past.

Now there are just two ways in which this can be done, namely: first, by destroying organized religion, as Russia is now attempting to do, and building upon its ruins some other organization which will
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—Courtesy Detroit News
RECEIVE HONORARY DEGREES
Jesse G. Vincent, Eng. M. (Hon.), Le Roy
Crummer, '93, LL. D. (Hon.), Ossian C.
Simonds, '78e, A. M. (Hon.)

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embody the essentials of religion, but be free from its faults. The second way is to assist organized religion, as it now exists, to eliminate some of its faults and be more effective in emphasizing and in spreading with ever increasing vigor, its essentials.

The first of the foregoing methods is the method of revolution, the second is the method of science, which is the method of evolution. Let every man reflect well on these things, before he assist in stabbing to death, or in allowing to starve to death, organized religion in the United States. Thus far I have presented the most outstanding and conspicuous contribution of religion to the development of the race.

The two discoveries listed with that of the golden rule in my opening sentences introduced us to the very main springs of the contribution of science to human progress. The idea that God, or nature, or the universe, whatever being you prefer, was not a being of caprice and whim, as had been the case in all the main body of thinking of the ancient world, but was instead a God who rules through law, or nature, capable of being depended upon, or a universe of consistency of orderliness and beauty that goes with order—that idea has made modern science and is unquestionably the foundation of modern civilization.

It is because of this discovery, or because of the introduction of this idea into human thinking, and because of the faith of the scientist in it that he has been able to harness the forces of nature and to make them do the work that enslaved human beings were forced to do in all preceding civilizations.

Yes, and much more than this. For it is not merely the material side of life that this idea has changed. It has revolutionized the whole mode of thought of the human race. It has changed the philosophic and the religious conceptions of mankind. It has laid the foundations for a new and stupendous advance in man's conception of God, for a sublimer view of the world and of man's place and destiny in it. The anthropomorphic god of the ancient world, the god of human possessions, frailties, caprices and whims is gone, and obviously with it is also gone the old duty, namely, or chiefly the duty to propitiate him.

The new God is a God of law and order, the new duty to know that order and to get into harmony with it. However, once destroy our confidence in the principle of uniformity, or belief in the rule of law, and our effectiveness immediately disappears, our method ceases to be dependable, and our laboratories become deserted.

I am not worrying here over the so-called introduction of the so-called principle of uncertainty in microscopic progress, an event that is causing much excitement among the physicists just now. They may indeed be consoling or, at least,

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The following is the schedule:

Game	Individual Order	Price
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Oct. 5—Michigan State	Unlimited	2.50
Oct. 12—Purdue	Unlimited	3.00
Oct. 19—Ohio State	Two	3.00
Oct. 26—Illinois	Unlimited	3.00
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illuminating to those non-physicists who have been worrying their heads over their inability to reconcile the principle of law with the fact of free will. We physicists have had much worse contradictions than that to put up with the subject of physics alone, as, for example, the reconciliation of the wave theory of light with the essentially corpuscular light-quant theory. Experiment has told us that both theories are right, and we have had the limitations of our knowledge jolted into us enough times lately in physics to believe it, in spite of our inability to see just yet how the reconciliation is to be made.

This fact worries Mr. Mencken, as it does essentially all dogmatic minds, so that in an interview of Eddington's extraordinarily profound book, "The Nature of the Physical Universe," he calls for another Huxley to tell us just exactly what is what in physics. But physicists never have been strong on dogmatism, not even in Huxley's day, and they are much less so now than then. We admit, to the complete bewilderment of minds like Mr. Mencken's, that we don't know everything yet. In his book, Eddington points out that it may be illuminating to those who worry about free will and determination

to know that in the subject of statistics, the behavior of a very large number of human beings such, for example, as the percentage of them that will get married per year, is accurately predicted, though the behavior of a particular individual in the group is completely unpredictable. Here is certainly a specific illustration of the co-existence of the reign of law with the practical freedom of choice which each individual knows he has. But I do not think this particular problem ever worried the physicist, for he has always known that his ignorance was as yet ample enough to cover the links in the reconciliation which must exist. Eighteenth and nineteenth century materialism never had any lure for him and modern developments have pushed it completely out of sight.

However, it is the existence of the idea of natural law or orderliness with which we are concerned, rather than with the proof of its universality, and no one who has any conception of what science has done since about 1600 A. D., the date at which this idea first began to spread throughout the consciousness of mankind, will be likely to question my initial statement that it is one of the three ideas which, whether true or false, has at least exerted upon the destinies of mankind.

The third or evolutionary idea, is the youngest of the two great ideas born of modern science. It is not yet 100 years old. Introduced by Darwin solely in its application to biological evolution, as discovery after discovery in modern science has pushed back farther and farther the age of the stars, of the solar system, of the earth, of the rocks, of fossil life, of prehistoric man, of recorded history, of social institutions, the evolutionary theory has come to dominate in a very broad way almost every aspect of human thought.

We have come to the realization, not only that if biological forms, but also if social institutions like the family, the state, religion or even war, have survived, it is because, after ages of trial in which many other institutions have competed with them and disappeared, they have had survival value.

We have come to study institutions to see why they have survived. We have come to realize that if we wish to eliminate an old institution, like war, for example, we are not likely to succeed simply by wishing it gone, nor indeed simply by pacifistic propaganda of any sort; we are only likely to succeed if the conditions which gave it survival value have been or can be eliminated. Hence the establishment of the League of Nations, of a world court, and the like, aimed precisely at eliminating some at least of these conditions.

In my judgment, however, war is now in process of being abolished chiefly by the relentless advance of modern science, the chief diverter of man's energies and interests from warlike to peaceful acts. War will disappear like the dinosaur when changes in world conditions such

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as are now being brought about primarily by the growth of modern science and applications have destroyed its survival value.

Again, because of the growth of this revolutionary idea in human thinking, we have come to see that an institution like religion, in so far as it deals with conceptions of God, the integrating factor in this universe of atoms, and of ether, and of mind, and of duties, and of consciousness, has not been and cannot be a fixed thing, that it has been continually changing with the growth of human knowledge, and that it will continue to expand as knowledge continues to grow.

I have thus presented the most outstanding and conspicuous contribution of religion to human progress and the two most significant contributions of science to human progress, and we are now ready to ask how these contributions by the reign of law have necessitated the increasing association of men into more and more intimately co-operating and independent groups, but the effectiveness of these groups, indeed the whole group life, becomes at once impossible unless the altruistic ideals of religion, the sense of social responsibility, permeates the whole, while the evolutionary concept, the contribution of science, is absolutely essential to an understanding of the development both of religion and of science. In a word, these three ideas interlock everywhere in a mutually helpful way. Not one of them can

have a normal and healthy existence without the others.

Personally I believe that essential religion as defined above is one of the world's most supreme needs, and I believe that one of the greatest contributions that the United States ever can make to world progress—greater by far than any contribution that we ever have or can make to the science of government—will

consist in furnishing an example to the world of how the religions and spiritual life of a people whose very existence is dependent upon science can evolve wholesomely, inspiringly, reverently, completely delivered from all unreason, all superstition and all unwholesome emotionalism; and may I express the hope that the class of 1929 at the University of Michigan may contribute its share toward that end.

News from the Classes

'69

On May 15, DR. RICHARD DEWEY, '69m, A. M. (Hon.), '00, of La Canada, was given a complimentary dinner by the Los Angeles Society for Neurology and Psychiatry at the University Club. Dr. Dewey, who is now in his 84th year, related at the dinner some of his experiences as a volunteer assistant surgeon in the Franco-Prussian war in 1870 and 1871 in the military hospitals in France and Germany.

'90

EVELYN MACNEVIN, daughter of M. G. MacNevin, '90m, is a member of the Philadelphia Grand Opera Company and the French-Italian Opera Company. Possessing a contralto voice of extraordinary quality and purity, Miss MacNevin was recently chosen out of hundreds of American artists by Charles I. Reid of New York City for recitals under the auspices

Reunion Issue is Coming

With this issue The ALUMNUS begins its regular summer schedule of publication, calling for one issue per month. The next number, featuring extensively Alumni Reunion Week on the Michigan Campus June 13, 14 and 15, will appear July 13.

of representative organizations in the United States.

'91

FRANK BURR TIBBALS, '91m, and Mrs. Tibbals, of Detroit, will entertain members of the Class of 1891 at their summer home at Hickory Island, 22 miles south of Detroit, on Thursday, July 4.